Contents

Conference Photograph vi

Preface vii

Conference Information viii

Transverse electron focussing
V.S. Tsoi 1

Relaxation of highly nonequilibrium electrons in bismuth point contacts
V.V. Andrievskii, Yu.F. Komnik and S.V. Rozhok 7

The fine structure of the first electron focusing line in bismuth
V.V. Andrievskii, Yu.F. Komnik and S.V. Rozhok 10

Drift electron focussing
M.V. Tsoi and V.S. Tsoi 14

Electron focussing in layered conductors
Yu.A. Kolesnichenko and T. Bedassa 18

Transverse electron focussing, quantum electron kinetics, and the Hall effect in Bi
V.S. Tsoi, M.D. Jaeger, B. Golding, M.V. Tsoi and J. Bass 22

Real space resolved investigation of ballistic electron transport in Bi single crystals
M. Primke, J. Heil and P. Wyder 26

Modern state of point contact spectroscopy of electron–phonon interaction in transition metals
A.V. Khotkevich 31

Current–voltage characteristics and magnetoresistance peculiarities in bismuth microbridges
K.Yu. Arutyunov, D.V. Gitsu, E.P. Kondrya, A.A. Nikolaeva and L.F. Rybalchenko 35

Elastic point-contact spectroscopy of electron–phonon interaction in superconductors
A.V. Khotkevich 39

Magnetoquantum oscillations in the resistance of metallic point contacts: Influence of nonequilibrium phonons
N.L. Bobrov, J.A. Kokkedee, N.N. Gribov, I.K. Yanson, A.G.M. Jansen and P. Wyder 42

The influence of Y dilution on the crystalline electric field part of the point-contact spectra of Van Vleck paramagnet $PrNi_5$
E. Bystrenová, M. Reiffers, J.A. Blanco and K. Flachbart 46

Quasiparticle relaxation kinetics in Sb point-contacts
O.P. Balkashin and I.I. Kulik 50

Point-contact study of the quasiparticle relaxation kinetic
O.P. Balkashin 54

Mixing and rectification properties of MIM diodes
S.K. Masalmeh, H.K.E. Stadermann and J. Korving 56

Theory of two-level systems and their role in point contacts
G. Zaránd and A. Zawadowski 60

Point contact resistance anomalies due to adiabatic renormalization of dynamical defects
V.I. Kozub and A.M. Rudin 64

Role of the local density of states fluctuations in metallic point contacts
G. Zaránd and L. Udvardi 68

Size effect in the electrical resistance of a ballistic point contact with single impurities
Yu.A. Kolesnichenko, A.N. Omelyanchouk and I.G. Tuluzov 73

Characterization of point-contacts showing size-effect in electron scattering by magnetic impurities
I.K. Yanson, V.V. Fisun, R. Hesper, J.M. Krans, J.A. Mydosh, N. van der Post and J.M. van Ruitenbeek 77

The effect of diffusive trajectories on conductance fluctuations in ballistic point contacts
J. Caro, V.I. Kozub and P.A.M. Holweg 81

Geometry dependence of the conductance fluctuations in metallic nanostructures
E. Scheer, H.v. Löhneysen and H. Hein 85

Wave-optical approach to conductance fluctuations in ballistic metallic point contacts
V.I. Kozub, J. Caro and P.A.M. Holweg 89

Conductance fluctuations in microstructures: Crossover between different transport regimes
A. Grincwajg, G. Edwards and D.K. Ferry 92

Formation of lithographic metallic hetero-contacts
N.N. Gribov, J. Caro and S. Radelaar 97

Properties of tungsten point contacts formed with chemical vapour deposition
N.N. Gribov, J. Caro, T.G.M. Oosterlaken and S. Radelaar 101

Non-ohmic hopping conduction in nanofabricated Si point contacts
J.W.H. Maes, W. Heuvelman, V.I. Kozub, J. Caro and S. Radelaar 105

High electric field transport in bismuth nanoconstrictions
J.B.C. van der Hilst, J.A. van Hulst, N.N. Gribov, J. Caro and S. Radelaar 109

Semiconductor-coupled Josephson junctions with a submicron split gate electrode
H. Takayanagi 113

The temperature dependence of subharmonic gap structures in superconducting heterocontacts of Nb, Pb, V and Ta
C.W. Smith, R.C. Reinertson and P.J. Dolan, Jr. 119

Magnetic field dependence of the Andreev reflection structure in the conductivity of S–N point contacts
Yu.G. Naidyuk, R. Häussler and H.v. Löhneysen 122

Microscopic theory of the phase-dependent linear conductance in highly transmissive superconducting quantum point contacts
A. Martín-Rodero, A. Levy Yeyati and J.C. Cuevas 126

Proximity high transmittance microjunctions in presence of a magnetic field
F. Tafuri, A. Di Chiara, F. Fontana, F. Lombardi and G. Peluso 130

Excess resistance effect in a normal metal contacting a superconductor
A. Kadigrobov, R. Shekhter and M. Jonson 134

Current-induced bound states in superconducting junctions of finite dimension
S.V. Kuplevakhsky and I.I. Fal'ko 138

Quasiparticles on a normal sphere in a superconducting continuum
U. Gunsenheimer and A. Hahn 141

The current–phase relation of a mechanically controllable breakjunction
M.C. Koops, L. Feenstra, B.J. Vleeming, A.N. Omelyanchouk and R. de Bruyn Ouboter 145

Probing the energy gap of heavy-fermion superconductors
H.v. Löhneysen 148

Anisotropy of the gapped Fermi surface of URu_2Si_2 in the antiferromagnetic state studied by point contact spectroscopy
Yu.G. Naidyuk, O.E. Kvitnitskaya, A. Nowack, I.K. Yanson and A.A. Menovsky 157

Andreev reflection in point contacts between the heavy-fermion superconductor UPt_3 and ordinary superconductors
Yu.G. Naidyuk, H.v. Löhneysen, G. Goll, C. Paschke, I.K. Yanson and A.A. Menovsky 161

Quasi-particle lifetime broadening in normal–superconductor junctions with UPt_3
Y. de Wilde, T.M. Klapwijk, A.G.M. Jansen, J. Heil and P. Wyder 165

Resistance scaling of point contacts between heavy-fermion superconductors and tungsten
K. Gloos, C. Geibel, R. Müller-Reisener and C. Schank 169

Magnetic transition in the heavy fermion compound $URu_{2-x}Re_xSi_2$
P. Steiner, L. Degiorgi, M.B. Maple and P. Wachter 173

Point-contact spectroscopy of the heavy-fermion antiferromagnet $CeCu_5Au$
C. Paschke, Yu.G. Naidyuk, O. Stockert and H.v. Löhneysen 177

Dense Kondo behaviour and many other effects in metallic point-contacts of rare-earth hexaborides
S. Kunii 181

Gap formation of Kondo insulator FeSi: Point contact spectroscopy
P. Samuely, P. Szabó, M. Mihalik, N. Hudáková and A.A. Menovsky 185

Andreev-reflection study of superconducting RNi_2B_2C compounds
L.F. Rybaltchenko, I.K. Yanson, A.G.M. Jansen, P. Mandal, P. Wyder, C.V. Tomy and D.McK. Paul 189

Point contact spectroscopy on the ferromagnetic superconductor $HoMo_6S_8$
F. Morales, R. Escudero, A. Briggs, P. Monceau, R. Horyn, F. Le Berre and O. Peña 193

Point contacts with the amorphous superconductor $(Mo_{0.55}Ru_{0.45})_{0.8}P_{0.2}$ in a magnetic field
R. Häussler, G. Goll, Yu.G. Naidyuk and H.v. Löhneysen 197

A point contact study on α_T $(BEDT–TTF)_2I_3$
S. Hirth, G. Ernst, A. Freimuth and A. Nowack 200

Anomalous temperature dependence of the Andreev peak for $Ag/Nd_{1.85}Ce_{0.15}CuO_{4-\delta}$ point contacts
R.C. Reinertson, C.W. Smith and P.J. Dolan, Jr. 202

Multiple Andreev reflection in YBCO break-junctions
Z. Zimmermann, S. Abens, D. Dikin, K. Keck and T. Wolf 205

Modification of $YBa_2Cu_3O_{7-\delta}$–Au point contact interface properties by applied electric voltage
A. Plecenik, M. Grajcar, P. Seidel, R. Nebel, T. Schmauder, Š Beňačka and M. Darula 209

Tunneling spectroscopy of $Bi_2Sr_2CaCu_2O_8$ single crystals
S.I. Vedeneev, A.G.M. Jansen and P. Wyder 213

Superconducting energy gap in Bi-cuprates
N. Hudáková, P. Samuely, P. Szabó, K. Knížek, V. Plecháček and D. Sedmidubský 217

Point-contact study of $(Hg_{0.7}Cr_{0.3})Sr_2CuO_4$
L.F. Rybaltchenko, I.K. Yanson, A.G.M. Jansen, P. Wyder, P. Mandal and J.B. Mandal 220

Superconducting parameters of YBCO and BSCCO from 'tunneling' spectroscopy
P. Seidel, M. Grajcar, A. Plecenik and R. Hlubina 224

Atomic structure and quantized conductance in metal point contacts
J.M. Krans, J.M. van Ruitenbeek and L.J. de Jongh 228

Conductance steps in point contacts: Quantization or cross-section jumps?
J.A. Torres and J.J. Sáenz 234

STM study of the atomic contact between metallic electrodes
C. Sirvent, J.G. Rodrigo, N. Agrait and S. Vieira 238

Ballistic Landauer-type thermal conductivity of a dielectric point contact
A.G. Shkorbatov, A. Feher and P. Stefanyi 242

Nonequilibrium mass enhancement in the thermoelectric power of normal metal point contacts
A.N. Omelyanchouk 245

Electron–phonon quenching in germanium microcontacts
L.H. Nguyen, H. Riegel, M. Asen-Palmer and E. Gmelin 248

Magnetic and electric Aharonov–Bohm effects in nanostructures
I.O. Kulik 252

Studies of electron energy levels in single metal particles
D.C. Ralph, C.T. Black and M. Tinkham 258

Scanning tunneling microscopy and spectroscopy study of nanometer-sized metal clusters
J.G.A. Dubois, J.W. Gerritsen, G. Schmid and H. van Kempen 262

STM study of the independent mesoscopic superconducting particles
M. Poza, J.G. Rodrigo and S. Vieira 265

Scaling of the Coulomb blockade
L.W. Molenkamp and K. Flensberg 269

Self-aligned in-line tunnel junctions for single-charge electronics
M. Götz, K. Blüthner, W. Krech, A. Nowack, H.-J. Fuchs, E.-B. Kley, P. Thieme, Th. Wagner, G. Eska, K. Hecker and H. Hegger 272

Tunneling and microcontacts on PbTe dots created by STM
D.N. Davydov, Yu.B. Lyanda-Geller, S.A. Rykov, A.G.M. Jansen, R. Deltour and P. Wyder 276

Image forces in tunnel and point-contact spectroscopy
A.M. Gabovich, V.M. Rozenbaum and A.I. Voitenko 280

Electrode geometry influencing the tunnel resistance in a mechanically controllable break junction
R.J.P. Keijsers, J. Voets, O.I. Shklyarevskii and H. van Kempen 283

The influence of adsorbed helium on tunneling in mechanically controllable break junctions
O.I. Shklyarevskii, R.J.P. Keijsers, J. Voets and H. van Kempen 287

Large corrugations and strong adhesion forces observed with a mechanically controllable break junction
J. Voets, R.J.P. Keijsers, O.I. Shklyarevskii and H. van Kempen 290

Detection of picosecond electrical transients in a scanning tunneling microscope
R.H.M. Groeneveld, Th. Rasing, L.M.F. Kaufmann, E. Smalbrugge, J.H. Wolter, M.R. Melloch and H. van Kempen 294

Depletion field focusing in semiconductors
M.W.J. Prins and A.P. van Gelder 297

List of Contributors 301

Subject Index 303